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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,144	04/17/2001	Hiroko Iwasaki	2271/50717-AY	7345

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EXAMINER	
MCPHERSON, JOHN A	
ART UNIT	PAPER NUMBER
1756	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/836,144	IWASAKI, HIROKO	
	Examiner	Art Unit	
	John A. McPherson	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12,16-21 and 24-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12,16-21 and 24-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/2/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/2/07 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 24-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification does not describe an optical recording medium comprising a first protection layer comprising SiO_2 and a compound having a thermal conductivity greater than 10 W/m.deg when in a bulk state, wherein the thermal conductivity of the first protection layer is greater than that of a second protection layer.

While the specification presents Comparative Examples 24-26 showing that when the lower protection layer has a higher themal conductivity than the upper layer then stable repetition characteristics are not achieved, these comparative examples are not directed to the emodiment wherein the first protection layer comprising SiO_2 and a compound having a thermal conductivity greater than 10 W/m.deg when in a bulk state. In these comparative examples, each protection layer consists of a single material (e.g. Al_20_3), not a mixture of SiO_2 and a material having a high thermal conductivity.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12 and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,902,584 to Uchiyama et al. (Uchiyama), utilizing US 4,983,505 to Higuchi et al. (Higuchi) as a teaching reference, in view of US 5,156,693 to Ide et al. [reference AE of the Information Disclosure Statement filed 4/17/01] (Ide).

Uchiyama discloses an optical recording medium comprising a recording layer on a substrate and a protective layer, wherein the protective layer comprises SiO_2, Si_3N_4 and a divalent metal oxide (such as MgO and ZnO), and optionally other members such as Al_2O_3 and AlN. The molar ratio of the silicon oxide to the silicon nitride ranges from about 50:50 to 90:10. See the abstract; column 4, lines 30-59; and Tables 2-4. It is the

position of the Examiner that silicon nitride inherently has a thermal conductivity greater than or equal to 10W/m.deg when in the bulk state, because thermal conductivity in the bulk state is a material dependent property. Additionally, Uchiyama discloses the recoding layer may be made of a phase conversion type material, for example Te-Ge, TeO_x and Te-Se . See column 6, lines 62 to column 7, line 17 and column 25, lines 3-4.

Higuchi teaches two types of recording media, namely magneto-optical recording media and phase-change recording media, wherein phase-change recording media relies upon the mechanism of a crystalline to amorphous phase change, in which information is reproduced on the basis of the change in reflectance that occurs in response to the phase change. Furthermore, as materials to be utilized in the recording layer of phase change recording media, Ide discloses TeSe, TeGe and TeO_x as illustrative Te based alloys. Accordingly, it is clear that the phase conversion type materials of Uchiyama refer to phase-change recording materials, in which information is reproduced on the basis of the change in reflectance that occurs in response to a crystalline to amorphous phase change, because the materials exemplified by Uchiyama are that same as those taught by Higuchi as phase-change recording materials.

With respect to claims 18-21, it is the position of the Examiner that the statements "for use with the phase variation type data recording layer in a EFM modulation type recording system" and "for use with a recording mechanism which uses melting and rapid cooling of the phase variation type data recording layer" are statements of intended use for the claimed recording medium, and therefor do not

provide a patentable distinction between the presently claimed recording medium layer and the recording medium of the applied prior art.

However, Uchiyama does not disclose a phase variation type recording layer consisting mainly of Ag, In, Sb and Te, wherein the recording medium is further provided with a reflective heat radiation layer.

Ide discloses a phase change type of information recording medium comprising heat resistant protective layers, a reflective layer which reflects light and/or discharges heat, and a recording layer which comprises a recording material of the composition AgInTeSb. See column 3, lines 3-16; column 4, lines 32-40; and column 5, lines 33-40. It would have been obvious to one skilled in the requisite art to utilize AgInTeSb, as taught by Ide, as the phase conversion type material in the optical recording medium of Uchiyama, because it is taught that AgInTeSb is a phase-change type recording material which exhibits a long life expectancy, improved C/N and writing ratios, and improved writing and erasing sensitivities. Furthermore, it would have been obvious to one skilled in the requisite art to provide a reflective layer, as taught by Ide, in the phase conversion type recording media of Uchiyama because it is taught that a layer of metallic materials, such as Al or Au, can be provided in such as phase change recording media for the purpose of reflecting light and/or discharging heat.

4. Claims 12, 16 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,156,693 to Ide et al. [reference AE of the Information Disclosure Statement filed 4/17/01] (Ide) in view of US 4,920,007 to Sawamura et al.

(Sawamura). Ide discloses an information recording medium comprising a reflective layer and a recording layer which comprises a recording material of the composition AgInTeSb, wherein the recording medium further comprises protective layers made from various oxides (exemplified by SiO_2) nitrides (exemplified by Si_3N_4), sulfides, carbides, or mixtures thereof. See column 3, lines 3-16 ; column 4, lines 32-40; and column 4, line 63 to column 5, line 3. Furthermore, Ide discloses in Example 1 an optical disc comprising a substrate, a first heat resistant protective layer of Si_3N_4, a recording layer of $Ag_{11}In_{11}Te_{23}Sb_{55}$, a second heat resistant protective layer of Si_3N_4, and a reflecting layer. See column 5, lines 53 to 63.

With respect to claims 18-21, it is the position of the Examiner that the statements "for use with the phase variation type data recording layer in a EFM modulation type recording system" and "for use with a recording mechanism which uses melting and rapid cooling of the phase variation type data recording layer" are statements of intended use for the claimed recording medium, and therefor do not provide a patentable distinction between the presently claimed recording medium layer and the recording medium of the applied prior art.

However, Ide does not disclose utilizing a protective layer comprising silicon dioxide mixed with silicon nitride in a molar ratio of 10-85% silicon nitride.

Sawamura discloses an optical recording medium provided with a protective layer of an oxide-nitride mixture, wherein the oxide includes silicon oxide and the nitride includes silicon nitride. The nitride and oxide are mixed in a ratio of 9:1 to 1:9, exemplified by a layer comprising Si_3N_4 and SiO_2 in weight proportions of 6:4. See the

abstract; column 2, lines 48-51; column 3, lines 1-9; and Example 1. It is the position of the Examiner that silicon nitride inherently has a thermal conductivity greater than or equal to 10W/m.deg when in the bulk state, because thermal conductivity in the bulk state is a material dependent property. It would have been obvious to one skilled in the requisite art to utilize a mixture of Si_3N_4 and SiO_2, as taught by Sawamura, as the material of the protective layer in the recording medium of Ide because it is taught that such a protective layer provides for superior durability and adhesion as compared to oxides and nitrides alone.

5. Claims 12, 16-21 and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchiyama, utilizing Higuchi as a teaching reference, in view of Ide, further in view of either one of JP 5-135409 (JP '409) or EP 0 569 664 (EP '664).

The disclosure of Uchiyama, utilizing Higuchi as a teaching reference, in view of Ide is discussed above in paragraph 3. However, with respect to claim 24-27, neither Uchiyama, Higuchi nor Ide disclose a phase variation type recording material wherein the thermal conductivity of the first protection layer is greater than the thermal conductivity of a second protection layer provided between a substrate and the recording layer.

JP '409 discloses an optical recording medium comprising a first protective layer (corresponding to the second protection layer of the present invention), a recording layer, a second protective layer (corresponding to the first protection layer of the present invention) and a reflective cooling layer on a substrate, wherein the first protective layer

comprises h-BN and the second protective layer comprises c-BN having a high thermal conductivity. See the abstracts and Figure 1.

EP '664 discloses an optical information recording medium comprising a substrate; an optional lower heat resistant protective layer (corresponding to the second protection layer of the present invention); a phase change recording layer comprising Ag, In, Te and Sb; an upper heat resistant protective layer (corresponding to the first protection layer of the present invention); and an optical reflecting layer, wherein the upper heat resistant protective layer includes a heat resistant material with a thermal conductivity of 1.0 W/cm·deg or more, which is a higher thermal conductivity than the dielectric materials in general use (i.e. for the lower heat resistant protective layer, see Example 4). See the abstract; page 3, lines 23-49; page 4, lines 25-29; page 14, line 55 to page 15, line 39; and Figures 1 and 5.

It would have been obvious to one skilled in the requisite art to utilize an upper protective layer having a higher thermal conductivity than that of a lower protection layer, as taught by either one of JP '409 or EP '664, in the recording media of Uchiyama (utilizing Higuchi as a teaching reference) in view of Ide because it is taught that providing an upper protective layer having a higher thermal conductivity than that of a lower protective layer allows for the diffusion of heat within the upper protective layer, thereby obtaining high writing sensitivity, obviating imperfect erasing, and improving the C/N ratio.

6. Claims 12, 16, 18-21 and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ide in view of Sawamura, further in view of either one of JP 5-135409 (JP '409) or EP 0 569 664 (EP '664).

The disclosure of Ide in view of Sawamura is discussed above in paragraph 4. However, with respect to claim 24-27, neither Ide nor Sawamura disclose a phase variation type recording material wherein the thermal conductivity of the first protection layer is greater than the thermal conductivity of a second protection layer provided between a substrate and the recording layer.

JP '409 discloses an optical recording medium comprising a first protective layer (corresponding to the second protection layer of the present invention), a recording layer, a second protective layer (corresponding to the first protection layer of the present invention) and a reflective cooling layer on a substrate, wherein the first protective layer comprises h-BN and the second protective layer comprises c-BN having a high thermal conductivity. See the abstracts and Figure 1.

EP '664 discloses an optical information recording medium comprising a substrate; an optional lower heat resistant protective layer (corresponding to the second protection layer of the present invention); a phase change recording layer comprising Ag, In, Te and Sb; an upper heat resistant protective layer (corresponding to the first protection layer of the present invention); and an optical reflecting layer, wherein the upper heat resistant protective layer includes a heat resistant material with a thermal conductivity of 1.0 W/cm·deg or more, which a higher thermal conductivity than the dielectric materials in general use (i.e. for the lower heat resistant protective layer, see

Example 4). See the abstract; page 3, lines 23-49; page 4, lines 25-29; page 14, line 55 to page 15, line 39; and Figures 1 and 5.

It would have been obvious to one skilled in the requisite art to utilize an upper protective layer having a higher thermal conductivity than that of a lower protection layer, as taught by either one of JP '409 or EP '664, in the recording media of Uchiyama (utilizing Higuchi as a teaching reference) in view of Ide because it is taught that providing an upper protective layer having a higher thermal conductivity than that of a lower protective layer allows for the diffusion of heat within the upper protective layer, thereby obtaining high writing sensitivity, obviating imperfect erasing, and improving the C/N ratio.

Response to Arguments

7. Applicant's arguments filed 5/2/07 have been fully considered but they are not persuasive.

With respect to the rejection over Uchiyama in view of Ide, Applicant argues that Uchiyama is directed to magneto-optical recording medium only. Specifically, Applicant argues that the recording layer in a magneto-optical recording medium can include phase conversion type materials, however readback from such media is not obtained by determining transitions between amorphous portions and crystalline portions on the recording layer, but rather by determining the direction of magnetization. However, as explained in detail by Higuchi, the phase conversion type materials of Uchiyama are not magneto-optical materials, but are instead known phase change recording materials

which rely upon the mechanism of a crystalline to amorphous phase change, in which information is reproduced on the basis of the change in reflectance that occurs in response to the phase change.

With respect to the rejection over Ide in view of Sawamura, Applicant argues that Sawamura is directed to protective layers for magneto-optical recording media, which are not suitable for an optical phase variation type data recording medium. However, is the position of the Examiner that the prior art recognizes utilizing the same protective layer for both types of media. For example, Uchiyama teaches a protective layer useful with either a magneto-optical recording layer or a phase conversion type recording layer (see above). Similarly, US 4,847,132 to Takao et al. (cited by the Examiner in the Office Action mailed 9/16/03), which is an English-language member in the same patent family as JP 63-259855 (cited in background section of the present specification), discloses a protective layer for optical recording media, wherein the recording layer is exemplified by either a phase change type material (e.g. see Example 1) or a magneto-optical material (e.g. see Example 8). Furthermore, see Higuchi, which discloses a protective layer for both magneto-optical and phase change recording media.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. McPherson whose telephone number is (571) 272-1386. The examiner can normally be reached on Monday through Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

John A. McPherson
Primary Examiner
Art Unit 1756

JAM
7/23/07